IS 12069 (1987): Coconut Fatty Acids [FAD 13: Oils and Oilseeds]

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*Indian Standard*

# SPECIFICATION FOR COCONUT FATTY ACIDS

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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# *Indian Standard*

# SPECIFICATION FOR COCONUT FATTY ACIDS

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# *Indian Standard*

# SPECIFICATION FOR COCONUT FATTY ACIDS

## 0. FOREWORD

**0.1** This Indian Standard was adopted by the Bureau of Indian Standards on 30 April 1987, after the draft finalized by the Oils and Oilseeds Sectional Committee had been approved by the Chemical Division Council and the Agricultural and Food Products Division Council.

**0.2** Coconut fatty acids are produced by the hydrolysis of coconut oil. Coconut oil is obtained by the extraction of copra ( *Cocos Nucifera* ). Coconut fatty acids comprise of about 90 percent saturated fatty acids, predominantly of low molecular weights. The main fatty acids is lauric acid which constitute about 50 percent of the total fatty acids.

**0.3** Coconut fatty acids are an essential ingredient of fat charge for toilet soaps, since they impart good lathering and hardness properties to soaps. They are also used as a raw material for oleo chemicals like coconut diethanolamide, coconut monoethanolamide, etc.

**0.4** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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## 1. SCOPE

**1.1** This standard prescribes the requirements and the methods of sampling and test for coconut fatty acids.

## 2. GRADES

**2.1** The material shall be of two grades, namely, grade 1 and grade 2. Grade 1 shall be a distilled grade while grade 2 shall be an undistilled grade.

*Rules for rounding off numerical values ( *revised* ).

## 3. REQUIREMENTS

**3.1 Description** — The material shall be produced by splitting the oil obtained from copra ( *Cocos Nucifera* ). Grade 1 material shall have been further subjected to vacuum distillation.

**3.1.1** If solvent is used in the manufacture of oil or fatty acid, a minimum flash point requirement will be operative.

**3.2** The material shall be free from adulterants, sediments, suspended and other foreign matter and separated water. The distilled grade shall be clear on melting.

**3.3** The material shall also comply with the requirements given in Table 1.

## 4. PACKING AND MARKING

**4.1 Packing** — The material shall be supplied in suitable containers as agreed to between the purchaser and the supplier.

**4.2 Marking** — The containers shall be securely closed and legibly and indelibly marked with the following information:

a) Manufacturer's name and trade-mark, if any;
b) Name and grade of the material;
c) Net mass of the material;
d) Batch or lot number in code or otherwise; and
e) Month and year of manufacture.

**4.2.1** Each container shall be legibly and indelibly marked with the information required under the *Standards of Weights and Measures* ( *Package Commodities* ) *Rules*, 1977.

**4.2.2** The containers may also be marked with the Standard Mark.

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers, may be obtained from the Bureau of Indian Standards.

## 5. SAMPLING

**5.1** Representative samples of the material shall be drawn and conformity of the material to the requirements of this specification shall be determined according to the procedure prescribed in Appendix B.

## 6. TESTS

**6.1** Tests shall be carried out by the methods referred to in col 5, 6 and 7 of Table 1.

**TABLE 1 REQUIREMENTS FOR COCONUT FATTY ACIDS**

( *Clauses* 3.3, 6.1, B-3.1, B-4.1, B-4.2, B-5.1 *and* B-5.3 )

| Sl No. | Characteristic | Requirements for | | Method of Test, Ref to | | |
|---|---|---|---|---|---|---|
| | | Grade 1 | Grade 2 | Appendix | IS : 548 ( Part 1 )-1964* | Indian Standard No. |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| i) | Moisture, percent by mass, *Max* | 0·1 | 1·0 | — | 5·2 | — |
| ii) | Saponification value | 262-275 | 260-275 | — | 15 | — |
| iii) | Acid value shall not differ from saponification value by more than | 4 | 14 | — | — | — |
| iv) | Iodine value, *Max* | 12 | 12 | — | 14 | — |
| v) | Mineral acidity | Nil | Nil | A-1 | — | — |
| vi) | Ash, percent by mass, *Max* | 0·1 | 0·1 | A-2 | — | — |
| vii) | Unsaponifiable matter, percent by mass, *Max* | 0·2 | 0·8 | — | 8 | — |
| viii) | Titre, °C | 24-28 | 22-27 | — | 12 | — |
| ix) | Colour, 1-in cell, $Y + 5R$, *Max* | 6 | — | — | 13 | — |
| x) | Lauric acid, percent by mass, *Min* | 45 | 45 | — | — | IS : 548 (Part 3)† |
| xi) | Flash point, °C | 100 | 100 | — | — | IS : 1448 ( P : 21 )‡ |

*Methods of sampling and test for oils and fats: Part 1 Sampling, physical and chemical tests ( *revised* ).

†Part 3 Analysis by gas liquid chromatography.

‡Methods of test for petroleum and its products: P : 21 Flash point ( closed ) by Pensky-Martens apparatus ( *first revision* ).

# APPENDIX A

[ *Table* 1, *Items* (v) *and* (vi) ]

## TEST FOR MINERAL ACIDITY AND ASH

### A-1. TEST FOR MINERAL ACIDITY

**A-1.1 Quality of Reagents** — Unless specified otherwise, pure chemicals and distilled water ( *see* IS : 1070-1977* ) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

**A-1.2 Reagents**

**A-1.2.1** *Methyl Orange Indicator* — 0·05 percent ( *m/v* ) solution.

**A-1.2.2** *Light Petroleum Ether* — ( 60°C/80°C ).

**A-1.3 Procedure** — Measure 10 ml of the melted sample into a separating funnel and shake intimately with three successive 10 ml portions of hot water. The temperature of the hot water should be more than the melting point of rice bran fatty acids. Combine the aqueous extracts, transfer to another separating funnel and remove traces of fatty acids in the water by extraction with light petroleum ether. Test the aqueous extract so obtained with a few drops of methyl orange indicator.

**A-1.4** The material shall be taken to have satisfied the requirements of the test if the indicator does not show acid reaction.

### A-2. DETERMINATION OF ASH

**A-2.1 Apparatus**

**A-2.1.1** *Platinum Crucible*

**A-2.1.2** *Desiccator* — containing an efficient desiccant, such as fused calcium chloride.

**A-2.2 Procedure** — Weigh accurately about 10 g of the air-dried material into a platinum crucible which has been previously dried, cooled in the desiccator and weighed. Heat the crucible over a low flame and ignite the contents gently. Incinerate the residue in a muffle furnace at 550 ± 10°C until free from carbon. Cool the crucible in a desiccator and weigh. Repeat the above procedure of heating, cooling and weighing until the difference between two successive weighings does not exceed 1 mg.

*Specification for water for general laboratory use ( *second revision* ).

**A-2.3 Calculation**

$$\text{Ash, percent by mass} = \frac{100\ m}{M}$$

where

$m$ = mass in g of the ash, and

$M$ = mass in g of the material taken for the test.

# APPENDIX B

( *Clause* 5.1 )

## SAMPLING OF COCONUT FATTY ACIDS

### B-1. GENERAL REQUIREMENTS OF SAMPLING

**B-1.0** In drawing, preparing, storing and handling test samples, the following precautions and directions shall be observed.

**B-1.1** Samples shall not be taken in an exposed place.

**B-1.2** The sampling instrument shall be clean and dry when used.

**B-1.3** Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination.

**B-1.4** To draw a representative sample, the contents of each container selected for sampling shall be mixed as thoroughly as possible by suitable means

**B-1.5** The samples shall be placed in clean, dry glass-stoppered bottles.

**B-1.6** The sample containers shall be of such a size that they are almost completely filled by the sample.

**B-1.7** Each sample container shall be sealed air-tight after filling and marked with full details of sampling, date of sampling and the year and month of manufacture of the material.

**B-1.8** Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature.

## B-2. SCALE OF SAMPLING

**B-2.0** Samples to determine conformity of the material to this specification shall be selected in accordance with the procedure given below. However, the purchaser and the supplier may agree to adopt any other procedure.

**B-2.1 Lot** — All the containers in a single consignment of one grade of the material drawn from a single batch of manufacture shall constitute the lot. If a consignment is declared to consist of different batches of manufacture, the batches shall be marked separately and the groups of containers in each batch shall constitute separate lots.

**B-2.2** The number of containers to be selected from a lot shall depend upon the size of the lot and shall be in accordance with col 1 and 2 of Table 2.

**TABLE 2 NUMBER OF CONTAINERS TO BE SELECTED FROM VARIOUS SIZES OF LOTS**

| LOT SIZE | NUMBER OF CONTAINERS TO BE SELECTED |
|---|---|
| *N* | *n* |
| (1) | (2) |
| Up to 5 | All ( *see* Note ) |
| 6 to 65 | 5 |
| 66 to 110 | 7 |
| Over 110 | 10 |

NOTE — When the lot size is 5 or less, the test results of each of the samples shall meet the corresponding requirement.

**B-2.3** These containers shall be selected at random from the lot. In order to ensure the randomness of selection, procedures given in IS : 4905-1968* may be followed.

## B-3. TEST SAMPLES AND REFEREE SAMPLE

**B-3.1** Draw with an appropriate sampling instrument small portions of the material from different parts of the selected containers, the total quantity being sufficient to carry out the tests for all characteristics given in Table 1.

*Methods for random sampling.

**B-3.2** Mix thoroughly all portions of the material drawn from the same container to form an individual sample to represent the container. Equal quantities from the selected containers shall be mixed together to form a composite sample to represent the lot.

**B-3.3** All the individual samples representing the selected containers and the composite sample representing the lot shall be divided into three equal parts, thus forming three sets of test samples. These parts shall be immediately transferred to thoroughly dried bottles which shall then be sealed air-tight with glass stoppers. These shall be labelled with all the particulars of sampling given in **B-1.7**. One set of the test samples shall be sent to the purchaser and one to the supplier.

**B-3.4 Referee Sample** — The third set of the test samples, bearing the seals of the purchaser and the supplier, shall constitute the referee sample and shall be used in case of dispute between the purchaser and the supplier. It shall be kept at a place agreed to between the purchaser and the supplier.

## B-4. NUMBER OF TESTS

**B-4.1** The tests for saponification value, acid value and titre ( *see* Table 1 ) shall be carried out on each individual sample of the set of test samples ( *see* **B-3.3** ).

**B-4.2** The tests for the remaining characteristics given in Table 1 shall be carried out on the composite sample of the set of test samples ( *see* **B-3.3** ).

## B-5. CRITERION FOR CONFORMITY

**B-5.1** A lot shall be considered as conforming to this specification if it satisfies the criteria in **B-5.2.1** and **B-5.3** for the characteristics given in Table 1.

**B-5.2** The test results for saponification value, acid value and titre shall be recorded as shown in Table 3. The mean and the range shall be calculated as follows and shall be recorded in col 4 and 5 respectively of Table 3:

$$\text{Mean } (\bar{X}) = \frac{\text{The sum of the test results}}{\text{Number of test results}}$$

Range ($R$) = The difference between the maximum and the minimum values of the test results

**B-5.2.1** The corrected mean as shown in col 6 of Table 3 shall be calculated. The lot shall be considered to have satisfied the requirement for a characteristic if the condition given in col 7 of Table 3 is satisfied.

**TABLE 3 CRITERION FOR CONFORMITY**

( *Clauses* B-5.2 *and* B-5.2.1 )

| Sl No. | Characteristic | Test Results 1, 2, 3 ... | Mean | Range | Corrected Mean | Criterion for Conformity |
|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| i) | Saponification value | | $\bar{X}_1$ | $R_1$ | $\bar{X}_1 - 0{\cdot}6\,R_1$ | Corrected mean specified value in Table 1 (ii) |
| ii) | Acid value | | $\bar{X}_2$ | $R_2$ | $\bar{X}_2 - 0{\cdot}6\,R_2$ | Corrected mean specified value in Table 1 (iii) |
| iii) | Titre | | $\bar{X}_3$ | $R_3$ | $\bar{X}_3 - 0{\cdot}6\,R_3$ | Corrected mean value in Table 1 (viii) |

**B-5.3** The composite sample when tested for the remaining characteristics not tested in **B-5.2** shall satisfy the corresponding requirements for them as specified in Table 1.

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# INTERNATIONAL SYSTEM OF UNITS ( SI UNITS )

**Base Units**

| *Quantity* | *Unit* | *Symbol* |
|---|---|---|
| Length | metre | m |
| Mass | kilogram | kg |
| Time | second | s |
| Electric current | ampere | A |
| Thermodynamic temperature | kelvin | K |
| Luminous intensity | candela | cd |
| Amount of substance | mole | mol |

**Supplementary Units**

| *Quantity* | *Unit* | *Symbol* |
|---|---|---|
| Plane angle | radian | rad |
| Solid angle | steradian | sr |

**Derived Units**

| *Quantity* | *Unit* | *Symbol* | *Definition* |
|---|---|---|---|
| Force | newton | N | 1 N = 1 kg.m/s$^2$ |
| Energy | joule | J | 1 J = 1 N.m |
| Power | watt | W | 1 W = 1 J/s |
| Flux | weber | Wb | 1 Wb = 1 V.s |
| Flux density | tesla | T | 1 T = 1 Wb/m$^2$ |
| Frequency | hertz | Hz | 1 Hz = 1 c/s (s$^{-1}$) |
| Electric conductance | siemens | S | 1 S = 1 A/V |
| Electromotive force | volt | V | 1 V = 1 W/A |
| Pressure, stress | pascal | Pa | 1 Pa = 1 N m$^2$ |